## FORUM

The following essays are written by scholars who have observed fossil fuel divestment from a variety of perspectives. Bill McKibben is an activist and architect of the movement. Matt Ridley is a scientist and popular science writer who rejects divestment movement's claim that it can help the environment. Willie Soon, writing with Christopher Monckton of Brenchley, is a scientist who questions the extent to which anthropogenic warming will be significant or dangerous, and also questions whether divestment is practicable, necessary, or desirable. Alex Epstein is a philosopher and energy expert, best known for defending fossil fuels as a "moral" good that benefits human wellbeing. William M. Briggs is a statistician.

Activists on behalf of fossil fuel divestment have sought to polarize the issue, radically reducing the options to a simple yea or nay. Polarization can be politically effective, but it impedes, rather than aids, the quest for a wise course of action. Reality rarely fits pre-packaged boxes. Prudent energy policy is no exception. In the spirit of restoring an appreciation for discourse and debate, we offer a variety of nuanced perspectives, unedited and without comment.

### Bill McKibben: Fossil Fuel Divestment is Moral, Financially Wise, and Strategic

"The fossil fuel divestment movement," officials of the National Association of Scholars have said, "is an exercise in futility. Its leaders fully understand that divestment, even if college trustees went along with it, would have no effect on fossil fuel companies or the environment. The divestment movement is really aimed at reinforcing the loyalty of students to the firebrands of the sustainability cause, who need a mass of followers in order to gain political leverage."

It seems to me that this assessment is wrong. To explain why, maybe it's worth recalling the genesis of the movement. It came when a team of UK-based financial analysts examined the annual reports and other data from the world's fossil fuel companies, and the countries that operate like fossil fuel companies (think Venezuela) and showed that they had roughly five times as much carbon in their reserves as scientists have demonstrated we could burn and keep global temperature increases to two degrees Celsius. These companies and countries have announced that they will indeed dig up these reserves; in fact, that's what their share prices and budget estimates depend on. Indeed, most of them continue to spend heavily to locate new sources of coal and gas and oil in remote corners of the planet, even though we can't burn what we already have.

Another way of saying this is, if they carry out their business plans, the planet tanks. This is, in purely scientific terms, fairly noncontroversial: there's been no serious pushback, even from the fossil fuel companies, against the basic math that undergirds the campaign. Faced with this kind of data, some of us

thought that a divestment campaign modeled on the one that helped defeat the apartheid government of South Africa might make sense, as one front in the ongoing fight to slow global warming.

One reason for this campaign was to spread the word about this new data, and in that effort the campaign has been entirely successful. In fact, this concept of a "carbon bubble," with the associated threat that reserves will become "stranded assets" has now become the conventional wisdom of the world's financial community. So, for instance, Mark Carney, the governor of the Bank of England, warned in the fall of 2014 that "the vast majority" of the planet's fossil fuel reserves are "unburnable," given their impacts on the climate. Similar language has come from the World Bank, Deutsche Bank, and many of the other largest financial players in the world. There is no doubt that the divestment movement was the key instrument for spreading this understanding.

Another reason for the campaign is to damage the economic standing and political power of the fossil fuel industry. This is harder to measure, but the companies themselves have testified to its impact. Peabody Coal, for instance, officially told shareholders in 2015 that the divestment campaign now represented a "material risk" to both their share price and their ability to raise new capital. This is a good thing, since recent studies in journals like *Nature* have made it clear that at least 80 percent of coal reserves need to stay underground if we are to meet even the weak climate targets set by international leaders. In 2014 David Crane, head of NRG, the largest independent power producer in the U.S., made headlines when he said the company planned to reduce carbon emissions from its more than 100 generating plants by 90 percent by 2050. As he explained, "If divestment from fossil fuel companies becomes the issue that preoccupies college campuses around America for the next decade, I don't relish the idea that year after year we're going to be graduating a couple million kids from college, who are going to be American consumers for the next 60 or 70 years, that come out of college with a distaste or disdain for companies like mine."

A third reason for the campaign is to allow individuals and institutions to act on their moral intuition that further investment in this industry is wrong. It's been gratifying to watch, for instance, as religious denominations grapple with this question and often reach the conclusion that it's simply wrong to keep investing in these industries. The World Council of Churches, the United Church of Christ, the Church of England, the Episcopal Church and many others have taken steps down this divestment path. As the University of Dayton, one of the nation's premier Catholic research universities, explained when it decided to divest its $670 million endowment:

> *This action, which is a significant step in a long-term process, is consistent with Catholic social teachings, our Marianist values, and comprehensive campuswide sustainability initiatives and*

> *commitments under the American College and University Presidents' Climate Commitment. We cannot ignore the negative consequences of climate change, which disproportionately impact the world's most vulnerable people. Our Marianist values of leadership and service to humanity call upon us to act on these principles and serve as a catalyst for civil discussion and positive change that benefits our planet.*

A fourth reason for the campaign was to point out to endowment holders doing valuable work with those monies that the new scientific understanding of a "carbon bubble" represented a serious long-term threat to those portfolios. Though campaigners did not present themselves as investment advisers, those institutions that followed their suggestion have made out handsomely, avoiding enormous losses over the last five years as fossil fuel stocks suffered sharp declines. Shortly before the California legislature instructed its public employees and teachers retirement funds to begin divesting, for instance, a report showed that those pension funds had lost $5 billion as a result of their fossil fuel investments. The fossil fuel industry has commissioned studies to show that investments in coal, gas and oil are profitable, but they have needed to go back to track returns for periods of two to five decades to make that case; few analysts, I think it's safe to say, imagine that the next fifty years of energy demand will resemble the past.

Colleges and universities have been among the supporters of this divestment effort, and for several unique reasons. One is that educational institutions have a fairly unique focus on the future, and so should understand that it is improper to educate young people by investing in companies whose business plans, if carried out, would destabilize the world those young people will inhabit in their prime. Another is that educational institutions have played a key role in helping society understand the threat climate change poses, and so may feel more deeply than other institutions the irony of simultaneously investing in the companies that continue to accelerate that warming. A third reason is that—particularly among science faculties—there is a dislike for corporations that have routinely lied about climate science, or sponsored disinformation campaigns. Some combination of those reasons have spurred institutions as diverse in history and mission as Stanford, Oxford, the Universities of California, Washington, and Hawaii, Sydney, Edinburgh, and Glasgow to divest.

That said, colleges and universities have been a relatively small part, especially in dollar terms, of the divestment effort. Huge funds—the Norwegian sovereign wealth fund, which is the second largest pool of investment money on earth, or pension funds like CALsters and CALpers, or the largest French insurance company AXA—have also joined in the campaign. Along with religious denominations, large philanthropies have also lent their weight, perhaps most notably the Rockefeller Brothers Fund. The Rockefeller announcement was significant not just because the family is heirs to the original fossil fuel fortune, but because they'd actively tried to persuade Exxon Mobil to make voluntary changes.

That unsuccessful effort showed the limits of "engagement" that some portfolio managers have tried to engage in as an alternative to divestment.

One critique of fossil fuel divestment has been that it is hypocritical, because those engaged in it continue to use fossil fuels. That strikes me as a superficial critique; most activists and many campuses are in fact working to reduce their own carbon footprint, but the reason the campaign is necessary is *precisely* that we all remain enmeshed in the fossil fuel system. In order for that to change with the speed which physics requires, we need to weaken the grip of the fossil fuel industry on our political system, and divestment is one means to that end. It's been inspiring to watch young people who, far from being lazy hypocrites, have been willing to spend countless hours and to risk administration disfavor by engaging in serious and committed protest.

Some also say that divestment distracts from more direct efforts to combat climate change—say, imposing the tax on carbon dioxide that most economists left, right, and center have long recommended. But of course such measures depend on weakening the power of this industry, the richest—and hence most politically powerful—on earth. Divestment is one way to lower that roadblock to reform.

There's also the idea that divestment is somehow politically partisan. This is not true, in my experience. Campaigners are likely to be critical of leaders from all political parties; it is in many ways a grassroots and bottom-up effort, led by capable and talented young people on college campuses, committed people of faith in religious communities, and particularly by people in "front line" communities most vulnerable to climate change. For me, a particularly moving moment was watching last spring as young women from South Africa and Fiji came to the Boston area to help explain to college audiences why it was so important they divest: that, indeed, the survival of their communities depended on the quick transition away from fossil fuels. While at Harvard, their efforts intersected with those of alumni like Bevis Longstreth, twice a Reagan appointee to the SEC and a retired partner at Debevoise Plympton, who said,

> *What does divestment accomplish? It avoids the ugly picture of trustees seeking to profit from emissions of carbon through the sale and burning of fossil fuel reserves and from the massive use of shareholder funds to search for more fossil fuels to sell and burn. Such behavior violates the most basic norms of a civilized society.*

Such unity amidst diversity I find inspiring.

Along with "violating the most basic norms of a civilized society," our current energy paradigm also violates the laws of physics. At bottom the entire climate change fight is simply an effort to get societies

to pay attention to the warnings of our scientific community, warnings that have now proved to be all too true. In the face of rapid Arctic melting, or swift ocean acidification, it's sad that it still takes sit-ins and teach-ins and petitions to move our civilizations to action. But clearly that's the case.

It's possible, as the National Association of Scholars warned, that all of this is "an exercise in futility." There are moments when it feels that way to me: as if we've simply waited too long to begin confronting the fossil fuel industry and speeding the transition away from dirty energy. The daily accumulation of new data on the damage already done by a changing climate can make one despair.

But there is also good news. The rapidly falling price of solar power and other renewable energy makes at least the possibility of rapid amelioration more likely. If it is too late to stop global warming it is perhaps not too late to slow it down, and prevent its worst effects.

To many of us, this seems among the most important efforts of our time, indeed of any time. It's possible that somewhere in the divestment movement there are "firebrands" seeking a "mass of followers" but the people I've encountered in this fight are simply committed human beings, of all ages and all stripes, trying their very best to deal with the truth that they've learned from direct experience in vulnerable communities, from their science textbooks and professors, from their moral intuition, or from their various faith backgrounds. Their commitment seems to me worth celebrating, not disdaining.

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### Matt Ridley: Fossil Fuel Divestment Makes No Sense

Institutions and pension funds are under pressure to dump their investments in fossil-fuel companies. The divestment movement began in America, jumped the Atlantic, and has become the cause célèbre of the retiring editor of *The Guardian*, Alan Rusbridger. The idea is that if we do not "leave it in the ground," the burning of all that carbon will fry the climate.

Some are resisting: the Wellcome Trust has politely declined to divest, saying it thinks it is better to keep the shares so it can lean on company executives to decarbonise; the University of Edinburgh unexpectedly voted last week not to divest, using a similar argument; and Boris Johnson has just rejected a motion by the London Assembly to divest its pension funds of fossil-fuel shares. The Church of England has cunningly confined its divestment to "thermal coal" and Canadian oil sands companies, getting good publicity but not having to sell many shares.

Of course, divestment represents an admission that fossil fuels are not going to run out, as was commonly believed until the shale bonanza began. The governor of the Bank of England, Mark Carney, seems sympathetic to the argument that climate change policies will soon make fossil fuels unburnable and that oil reserves may become "stranded assets."[919] So sell your BP shares before the company's raison d'etre vanishes in a puff of non-smoke.

It's all mad. Divestment won't work, is unethical, hypocritical, aimed at the wrong target, and based on flawed premises.

First, there is a buyer for every seller. Those pressing for fossil-fuel divestment see themselves as the successors to those who fought apartheid and tobacco by the same means. But all the tobacco divestment movement achieved in the 1990s was to lower share prices temporarily, enabling tobacco companies to buy back their shares.[920] Anybody who bought tobacco shares when others sold beat the market handsomely over the next decade. Smoking is going to be killed by innovation (vaping), not divestment.

Tobacco (like apartheid) has no health benefits, only harms. That's not true of fossil fuels. They make fertilizer, which banishes famine and lowers food prices. They replace wood as a fuel, saving forests. They transport goods and people, raising living standards. They make affordable electricity, providing

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919 Letter from Mark Carney, governor of the Bank of England, to Joan Walley, Chair of the Environmental Audit Committee in Parliament, October 30, 2014. http://www.parliament.uk/documents/commons-committees/environmental-audit/Letter-from-Mark-Carney-on-Stranded-Assets.pdf.

920 Terry Tamminen, "Is Divestment Actually The Best Strategy To End Fossil Fuels?" *Fast Company*, July 3, 2014. http://www.fastcoexist.com/3032527/is-divestment-actually-the-best-strategy-to-end-fossil-fuels.

light, heat, and freedom from fatal indoor smoke. The divestment fanatics who think only of the bad effects of fossil fuels ignore all this.

So, second, if the world went cold turkey on fossil fuels the people who would suffer most would be the poor. Divestment is not an ethical thing to do; it's a harsh, cold-hearted decision. It says: sorry, poor people (and rainforests), we have to make you suffer today so that our great grandchildren can be safe from a risk of rising sea levels in the event that no other energy technology comes along.

Third, it is hypocritical because the divestors continue to use electric light and gas heating, and to travel by car and plane. That's because there is no alternative to fossil fuels on the scale we use them. Nuclear power could eventually fill the gap but not cheaply and not quickly: it currently provides 4 percent of world energy consumption. Wind and solar provide only 1 percent between them, after two decades of frantic expansion, and need far too much land. We would need to build 100,000 wind turbines on 30,000 square miles of land each year just to keep up with the annual increase in world electricity consumption, let alone gain market share.[921] That's a whole Scotland each year.

Fourth, the campaign will have little effect on the oil industry. Exxon is the 11th biggest oil company in the world in terms of reserves; Shell 19th and BP 20th. All but one (Lukoil) of the rest of the top 20 belong to governments: Iran, Saudi Arabia, Venezuela, Iraq, Nigeria, Russia, and so on.[922] These regimes will pay no attention to students occupying senior common rooms in London. Indeed, if they see quoted firms hurt by divestment and pulling out of oil, they will shed a crocodile tear, jack up the price, and move in. It's not just state-owned firms that will benefit. So will those owned by private equity or families. I regularly declare a commercial relationship with a coal company, but it's not quoted on the stock market, so divestment will not hurt it.

Finally, the whole argument is based on a flawed premise. The divestors argue that if we are to have a decent chance of limiting any temperature rise to 2 degrees Celsius from pre-industrial levels, then we must burn less carbon in the future than we have burnt in the past two centuries.

Specifically, the Intergovernmental Panel on Climate Change (IPCC) says that we can burn only 820 gigatons of carbon (gtc) in total to have a 50 percent chance of staying within 2 degrees Celsius. We burn about 10gtc a year and have burnt 515gtc so far. Since we have raised the world average temperature by about 0.8 degrees Celsius (some of which may have been natural), then they are suggesting that

921 Paul Denholm, Maureen Hand, Maddalena Jackson, and Sean Ong, "Land-Use Requirements of Modern Wind Power Plants in the United States," National Renewable Energy Laboratory, August 2009. http://www.nrel.gov/docs/fy09osti/45834.pdf.

922 "Big Oil's Bigger Brothers," *The Economist*, October 29, 2011. http://www.economist.com/node/21534794.

another 300gtc has an even chance of bringing us to the point where the temperatures will have risen by another 1.2 degrees Celsius.

Note that they are therefore assuming a rapid acceleration of the rate of warming, whereas in fact it has slowed down in the past two decades. That's one flaw.

A bigger one is this. The IPCC models assume high sensitivity of the climate to carbon dioxide. With a more realistic estimate of climate sensitivity taken from a raft of recent high-quality, observation-based studies, and still assuming fossil fuel burning at 10gtc a year, we would probably not hit the 2-degree threshold for more than 100 years (which is bang in line with the rate of warming over the past 60 years). A third flaw is that 2 degrees Celsius above pre-industrial levels is not the point at which climate change becomes catastrophic. It is just the point where (if it comes quickly enough and we do nothing to adapt) it — perhaps — becomes net harmful. So we are being asked to prioritize the possibility of the start of net harm in the time of our great-great-grandchildren over the plight of the poor today.

By 2115 the OECD reckons that the average person will be between three and 15 times richer than today — if they are not, they will have burnt less carbon — so they will most likely be using advanced forms of zero-carbon energy.

Where is the morality in hurting today's poor people for the sake of these distant plutocrats?

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## Willie Soon and Lord Christopher Monckton: Divestment? Schmivestment! Coal, Oil and Gas Are the Best Guarantors of Life, Liberty and Happiness

The totalitarian campaign to bully academic and other institutions into selling their shares in coal, oil, and gas companies owes nothing to science and all to the historical fact that these firms were once the biggest donors to libertarian parties.

Let us do the science anyway, and let us do it objectively. Dispassion is a prerequisite to forming a view on whether "divestment" is justifiable – and on whether it will make any difference to anything except the artificial consciences of a narrow political faction.

Science, intrinsically agnostic on socio-political movements, is the only medicine available to counter the psychological application of fear factors by the campaigners against fossil fuels.

Coal, oil and natural gas are not our only sources of hydrocarbon fuel. Scientists can now produce oil in the lab[923] abiogenically by mimicking natural conditions in the Earth's mantle, invalidating the argument that "fossil" fuels (they are not in fact fossils-based[924]) will run out unless we restrict their use. Likewise, mining scarce minerals such as uranium, gold, and silver from sea water[925] and volcanic-zone reservoirs[926] becomes more profitable as science improves the extraction techniques. This is why the economist Julian Simon was fond of proposing that the ultimate limit to resource exploitation is not matter but mind. We think, therefore we can.

Now that science has put paid to the scarcity scare, divestment campaigners turn to the pseudo-scientific argument that our enrichment of the atmosphere by emitting CO2 from burning coal, oil, and gas may be dangerous. Recently, for instance, a scientific paper baselessly predicted the total melting of the Antarctic ice sheet.[927] The timing of this and other profitable fictions coincides with the December 2015 UN climate conference in Paris, France.

Carbon dioxide in the air was once at 20 times today's concentration. Today, more than a quarter of a millennium after the industrial revolution, to the nearest tenth of 1 percent there is no CO2 in the air at all. How proportionate was it, then, for the authors of this latest pseudo-science scare to publicize their paper by saying: "It is time to stop using the sky as a waste dump"? Plants and trees do not see CO2 as "waste."

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923 Kolesnikov et al. (2009) *Nature Geoscience*, vol. 2, 566-570.

924 See especially Thomas Gold (1998) "The Deep Hot Biosphere: The Myth of Fossil Fuels".

925 Carboni et al. (2013) *Chemical Science*, vol. 4, 2396-2402.

926 Simmons et al. (2015) *Geothermics*, in press, doi: 10.1016/j.geothermics.2015.07.009.

927 Winkelmann et al. (2015) *Science Advances*, in press, doi:10.1126/sciadv.1500589 (online September 11).

With water and photosynthesis, it is their food. Paradoxically, the *soi-disant* "greens" are now campaigning against the one substance that greens the planet faster than anything else – in fact, the total biomass of trees and plants worldwide has been rising by around 3 percent per decade for 30 years – thanks to the CO2 we are returning to the atmosphere from which it originally came.

The Antarctic ice-melt scare paper is not a proper scientific work. The authors left out many known geological, tectonic and other physical forces in their cartoon-like "simulations" – the computer modelers' substitute for real science. Not the least of the factors they somehow omitted was the failure of the Antarctic to warm at all throughout the satellite era. For this reason, since 1979 the small warming that has occurred has not been global.

For good measure, they overstated the rate of global warming; overstated its effect on the ice; failed to account properly for the vast amounts of energy required to bring about a phase-change from water's solid to its liquid state; ignored the newly-discovered geothermal heating sources beneath the Antarctic[928] and Greenland[929] Ice Sheets; and did not take account of the known stabilizing feedbacks that preserve the West Antarctic Ice sheet[930]: Gomez et al. (2010) concluded that "local sea-level [falls] following rapid ground-line migration will contribute a stabilizing influence on marine ice sheets."

The "Antarctic is melting" paper is prejudiced to promote social-political alarmism rather than to provide a dispassionate examination of the relevant scientific questions or issues. The bias is all the more discomfiting when it is also well-known from geological and cryospheric studies that the Greenland and Antarctic ice sheets are both known to have been relatively stable[931] under the vagaries and extremes of weather and climatic conditions over the past 1-2 million years. This has led some scientists to conclude recently that "the northern ice sheet dome, which today contains 85% of the total ice sheet volume, has remained within 100 km of its present margin for at least 1 million years, and possibly going back as far as 2.4 million years. The ice sheet has therefore survived both interglacials and 'superglacials' [i.e., very warm climate intervals unlike what is occasionally being used now to denote man-made warming in the near future] that were both warmer and longer than the present. This may give us some hope for the future."

928 Lough et al. (2013) *Nature Geoscience*, vol. 6, 1031-1035; Schroeder et al. (2014) Proceedings of the National Academy of Sciences, vol. 111, 9070-9072.

929 Petrunin et al. (2013) *Nature Geoscience*, vol. 6, 746-750.

930 Gomez et al. (2010) *Nature Geoscience*, vol. 3, 850-853.

931 Bierman et al. (2014) *Science*, vol. 344, 402-405; Funder et al. (2014) Geophysical Research Abstracts, vol. 16, EGU2014-10721; Winnick & Caves (2015) Geology, vol. 43, 879-882.

Similarly, the latest reconsideration of the old question of ice sheets in the mid-Pliocene warm period 3 million years ago has led to a new conclusion[932] that the East Antarctic Ice Sheet "is substantially less sensitive to radiative forcing than previously inferred … and that dramatic deglaciation of the EAIS under modern $pCO_2$ is not supported by the geologic record."

This highly speculative paper, like so many others predicting doom, is not science.

One more serious scientific question[933] to answer is on how local and global sea level can vary by 65 to 300 feet naturally during very warm greenhouse or hothouse Earth climatic conditions in which little or no ice are available to melt or refreeze to begin with.

So, who is "treating the sky as a waste dump"? Who is not holding dear the prospects of future generations? And who would hide the problems of pollution of our air, water and land by deliberately ignoring efforts to mitigate its negative or harmful effects?

The claim that returning CO2 to the air from which it once came must cause only harm is one of the important assumptions underpinning demands for "divestment." It is, however, erroneous.

The climate will not be adversely affected by the use of fossil fuels. The measured scientific fact is that global temperatures as measured by NOAA's satellites confirms a lack of warming for approaching 19 years, though atmospheric CO2 concentration rose by a tenth. During the same period, one-third of all manmade influences on the climate since 1750 rose. But there has been no warming in response. Even on the surface thermometer records, the rate of warming in the quarter-century since 1990 has been only half of what the UN's climate panel had then predicted on the basis of what it called "substantial confidence" that the computer models on which it relied had captured all essential features of the climate. Plainly, something has gone very wrong.

Another recent study has also confirmed that the current global warming hiatus can best be explained by the counteracting effects of large winter cooling over Eurasia, ruling out several other recent popular explanations such as storage of "excess" heat in the deep ocean. These authors conclude that the observed winter cooling over Eurasia is "essentially from atmospheric internal variability [rather than any

932 Winnick & Caves (2015) *Geology*, vol. 43, 879-882.

933 MacLeod et al. (2013) *Geology*, vol. 41, 1083-1086; Haq (2014) Global and Planetary Change, vol. 113, 44-58; Wendler and Wendler (2015) *Palaeogeography, Palaeoclimatology, Palaeoecology*, in press, doi:10.1016/j.palaeo.2015.08.029; Wendler et al. (2015) *Palaeogeography, Palaeoclimatology, Palaeoecology*, in press, doi:10.1016/j.palaeo.2015.08.013.

rising atmospheric carbon dioxide effects]."[934] Several other recent scientific publications[935] also explain that the so-called sensitivity of the climate to rising atmospheric carbon dioxide has been significantly over-estimated by publications summarized in recent reports by the UN's climate panel.

Ocean "acidification" is another serious untruth. Environmental activists, including the UN's climate panel, invented this public deception,[936] which is now blindly rubber-stamped by the "divestment" movement. Scientific analysis shows that the biology and chemistry of the ocean have never been controlled by the concentration of CO2 in the air. The reverse is true: growth of oceanic life has long been limited by CO2 starvation caused by the control of carbonate and bicarbonate biogeochemical cycling. Growth of lobsters and crabs and other sea life in laboratory experiments is enhanced,[937] rather than destroyed, if the partial pressure of CO2 in the air and hence in the ocean rises.

For the past 50 million years the ocean has been pronouncedly alkaline and, because it is self-buffering, must remain that way. The pH of the ocean – a measure of its acid-base balance – is around 8.0. Neutral is 7.0 on the pH scale. Rainwater, at 5.4, is pronouncedly acid. But does it "acidify" the ocean on which almost three-quarters of all precipitation falls, and into which much of the remainder is poured via the world's rivers? And what steps would the "divestment" campaigners propose to take to prevent water from the ocean abyss from rising to the surface? It is up to ten times more acidic than the water at the surface.

The purveyors of doom also predict loss of biodiversity and even the extinction of certain terrestrial bird and mammal species. Once again, several serious scientific examinations of the issues[938] provide us with more reliable and more positive news than the divestors.

The central truth is that any attempt to stop the combustion of fossil fuels will cause far more harm and lead to more deaths than the panic-mongers predict would arise from "global warming." The activists know that many of the catastrophes they predict are exaggerated if not downright fraudulent. Yet they still profit by circulating these lurid predictions, based on models that have been proven false.

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934 Li et al. (2015) *Geophysical Research Letters*, in press, doi:10.1002/2015GL065327 (online September 12).

935 Lewis (2015) *Climate Dynamics*, in press, doi:10.1007/s00382-015-2653-7; Mauritsen and Stevens (2015) *Nature Geoscience*, vol. 8, 346-351; Monckton et al. (2015) *Science Bulletin*, vol. 60, 122-135; Monckton et al. (2015) Science *Bulletin*, vol. 60, 1378-1390; Stevens (2015) *Journal of Climate*, vol. 28, 4794-4819.

936 Please see the discussion and explanation in this talk on "Acid Oceans, Osteoporosis of the Sea, and the $CO_2$ Monster": https://www.youtube.com/watch?v=yYbIdJBHAfk

937 Ries et al. (2009) *Geology*, vol. 37, 1131-1134.

938 Botkin et al. (2007) *Bioscience*, vol. 57, 227-236; Loehle and Eschenbach (2012) *Diversity and Distributions*, vol. 18, 84-91.

UNEP predicted in 2005 that there would be 50 million climate refugees by 2010.[939] When this prediction failed, revisionists insisted in 2011 that the same prediction will now come true by 2020. What will these false prophets do in another five years? Likewise, predictions of Arctic summers to be ice-free by 2013 – no, 2014 – no, make that 2015 – er, um … The ice is still there.

True to form, giant fast-growing Arctic mosquitoes[940] and potential resurrection of 30,000 years old giant viruses from melting Siberian permafrost[941] are now two favorite threats from the alarmist paradise.

The authors of the paper predicting the total disappearance of the Antarctic ice sheet write that with "unrestrained future $CO_2$ emission, the amount of sea-level rise from Antarctica could exceed tens of meters over the next 1000 years and could ultimately lead to the loss of the entire ice sheet." This baseless, childish fear-mongering is all the more intolerable given the fact that tide-gauge measurements of sea level changes around coastal regions of the world show sea level as rising no more than 4 to 8 inches a century.[942] Most empirical models of global sea-level change contain serious miscalculations because isostasy[943] (the rebounding of the land masses once covered in ice during the last Ice Age) varies from place to place, making a true record of sea-level change difficult.

Life needs no apology. The use of coal, oil, and natural gas is necessary. It is particularly necessary for more than a billion people who have no electricity. Coal-fired electricity is the cheapest in the world by a large margin. It is reliable, it is efficient, it is clean, and there is enough coal to last for hundreds if not thousands of years.

Why do we say coal is "clean?" Simply because of advanced modern methods. Using fluidized-bed combustion or pelletized coal burned at very high temperatures in boilers is so efficient that the only unwanted heat loss comes by conduction through the furnace walls. This emits far less soot than in earlier generations, and what little is emitted is trapped by various processes such as fly-ash scrubbing before it reaches the outside air. The ash, instead of polluting the atmosphere, is instead turned into the world's most efficiently-insulating house bricks.

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939 "Five or More Failed Experiments in Measuring Global Sea Level Change. Willie Soon, Ph.D.," *DDP Meetings*, YouTube, August 1, 2013. https://www.youtube.com/watch?v=1gmW9GEUYvA

940 Culler et al. (2015) *Proceedings of the Royal Society B*, vol. 282, doi:10.1098/rspb.2015.1549. For known antidotes, consider Reiter (2000) *Emerging Infectious Diseases*, vol. 6, 1-11; Reiter (2008) *Malaria Journal*, vol. 7 (suppl. I), S3, doi:10.1186/1475-2875-7-S1-S3; Gething et al. (2010) *Nature*, vol. 465, 342-345.

941 Legendre et al. (2015) *Proceedings of the National Academy of Sciences*, in press, doi:10.1073/pnas.1510795112.

942 Morner (2013) *Energy & Environment*, vol. 24, 509-536; Beenstock et al. (2015) *Environmental and Ecological Statistics*, vol. 22, 179-206.

943 Morner (2015) *International Journal of Geosciences*, vol. 6, 577-592.

The divestment movement, therefore, is a false, pseudo-scientific ideology. Fortunately, it will make no difference whatsoever to those who produce or rely upon coal, oil, and gas. If over-politicized universities refuse to hold shares in profitable hydrocarbon enterprises, others will buy those shares and profit instead. But the integrity of science suffers when the discipline is wedged into political mottos and rally cries. Fossil fuel divestment is an affront to the scientific method and the quest for truth.

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*Lord Christopher Monckton, Third Viscount Monckton of Brenchley, is chief policy advisor to the Science and Public Policy Institute. Mr. Monckton was Special Advisor to Margaret Thatcher as U.K. Prime Minister from 1982 to 1986, during which time he was among the first to advise that global warming should be investigated. Like Mrs. Thatcher, he later changed his mind about the risks.*

## Alex Epstein: The Moral Case for Fossil Fuels and the Immorality of Divestment

### The Question at Issue

The divestment debate is, at root, a debate over one question: is humanity's continuing—and expanding—use of fossil fuels a moral choice or an immoral choice?

While much of the debate has centered over the financial practicality of divestment—whether divestment will indeed drive down fossil fuel firms' stock prices or drive down the value of divestors' portfolios—the stated purpose of the divestment movement is to make a bold, symbolic statement to morally marginalize the producers of fossil fuels in our society.

Bill McKibben, in his 2012 *Rolling Stone* essay inaugurating the movement wrote: "A rapid, transformative change would require building a movement, and movements require enemies…And enemies are what climate change has lacked."[944]

The divestment movement wants the public to view the fossil fuel industry as "Public Enemy Number One." And every time a university or municipality or pension fund announces its intention to divest fossil fuels stocks, it contributes to the goal of moral marginalization.

Rather than take the moral issue head-on and declare the fundamental morality of producing fossil fuels now and in the future, the fossil fuel industry has ignored or sidestepped the issue—conceding the moral legitimacy of its opponents. But do those opponents deserve the high ground?

To ask the basic question again: is humanity's continuing—and expanding—use of fossil fuels a moral choice that we should continue or an immoral choice that we should stop?

To answer this question, we need to do something that is almost never done in our energy and environmental debates: name the *moral standard* by which we judge something.

In the energy debate, there are two fundamentally different standards of value that are invoked.

The first standard by which we evaluate forms of energy is whether they maximize human well-being (short- and long-term). I call this the human standard of value. The second standard by which we evaluate forms of energy is whether they minimize our impact on the planet. I call this the non-human or Green standard of value.

944 McKibben, "Global Warming's Terrifying New Math."

I evaluate the use of fossil fuel, and everything else, by the human standard. I believe human beings should not seek to minimize their impact on the planet but rather maximize their positive impacts and only minimize their negative impacts—negative on human beings. Whether continued fossil fuel use is moral, then, is a function of whether, when we look carefully at both the benefits and costs of fossil fuel use versus the benefits and costs of abstaining from or restricting fossil fuels use, which is the alternative that better serves human life.

**The Evidence**

In answering this question, we have an intellectual cornucopia of evidence to work with—namely, the last 35 years of history. While the major claims about the catastrophic costs of fossil fuel use—catastrophic climate change, catastrophic pollution, catastrophic resource depletion—are often portrayed as cutting edge, all are at least 35 years old and have a clear track record.

And that track record is one of unambiguous failure of the catastrophists' theories and wondrous improvement of our civilization driven by the fossil fuel industry.

Let us review some of the essential history and its implications for the present and future.

Predictions that increasing atmospheric CO2 from .03 percent to .04 percent would cause runaway warming were met by the reality that CO2 causes mild, manageable, and arguably desirable warming—and certainly a desirable increase in plant growth. Predictions that pollution would be ever-worse were met by the reality that human technology can progressively purify our endeavors. US air pollution has declined radically in since the 1970s despite a 25 percent increase[945] in fossil fuel use. Predictions that we would "run out of fossil fuels" were met by the reality that there are many, many times more potential resources underground than we have used in the entire history of civilization—and that technologies like shale energy and oil sands energy are making those potential resources into actual fuel that heats our homes, powers our tractors, and runs our hospitals.

Looking at this evidence should cause us to fundamentally question the people, institutions, assumptions, and faulty thinking methods that led to the shockingly false predictions, and to suspect that they have a bias against fossil fuels that causes them to exaggerate or fabricate threats and ignore benefits.

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945 *Statistical Review of World Energy*, BP, 64th edition, 2015. http://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html/.

And what benefits there have been. Since 1980, the world has increased its use of coal, oil, and natural gas by 80 percent.[946] At the same time, the average life expectancy of our world population of 7 billion individuals has gone up 6 years—6 years of precious life! Every other metric of human well-being has also improved, from income to access to health care to nourishment to clean water access.[947]

This is no coincidence. The energy industry is not just any industry; it is the industry that powers *every other* industry. When there is more cheap, plentiful, reliable energy in the world, more individuals are empowered to use machines to improve their lives. That is why as China and India each increased fossil fuel use by 5 times, hundreds of millions got their first light bulb, their first refrigerator, or their first decent-paying job. To the extent energy use is restricted, fewer people are empowered.

And, we should observe, we live in a world where 3 billion people are fundamentally disempowered, possessing almost no access to energy[948]—including over 1 billion who have absolutely no electricity.[949] We should recognize that an urgent priority should be to liberate the forms of energy that are most capable of empowering individuals on a global scale—hydroelectric power, nuclear power, and above all, fossil fuels.

We should recognize that any restrictions on these forms of power are guaranteed to retard progress—as any restriction of competition does—and in particular that our continuing efforts to mandate solar and wind are failures that would be catastrophic if mandated on a large scale.

For example, Germany, which divestment proponents cite as a green energy success, is a clear-cut example of the failure of even beginning to try to run a country on solar and wind. Germany subsidized these technologies so much that the average German pays 4 times what the average American does—but because these renewable sources of energy are fundamentally unreliable, the German economy can rely on less than 3 percent of the theoretical capacity of solar and wind. This, combined with Germany's attack on nuclear—the one form of non-carbon electricity that can scale to billions of people—has led Germany to build additional coal capacity. Germany's entire solar and wind apparatus is not a productive energy source. It is an absurd consumer expenditure—which delivers prestige and guilt alleviation, while adding no net energy and subtracting reliability.

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946 *Ibid*.

947 Indicators, Data, The World Bank. http://data.worldbank.org/indicator.

948 "Modern Energy for All," World Energy Outlook, International Energy Agency, http://www.worldenergyoutlook.org/resources/energydevelopment/.

949 "Access to electricity (% of Population)," Data, The World Bank. http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS/.

As for future concerns about the climate impact of fossil fuels, we must recognize that these are based on the invalidated computer simulations that predicted catastrophic warming today. And, even more importantly, it would share with the public the most important climate data we have, the data about trends in *climate-related deaths*: deaths from drought, flood, extreme heat, extreme cold, storms, and other climate-related dangers. We have been told for decades that the climate is becoming ever more dangerous. In 1985, Barack Obama's Science Advisor John Holdren predicted that "carbon dioxide climate-induced famine could kill as many as a billion people" by 2020.

But according to the international disaster database, climate-related deaths are down 98 percent over the past 80 years.[950] In 2013, there were 21,122 such deaths worldwide compared to a high of 3.7 million in 1931, when world population was less than a third of its current size. How is this wonderful development possible? Because fossil fuels aren't taking a naturally safe climate and making it dangerous, they're taking a naturally dangerous climate and making it safe—through energy that enables us to produce sturdy homes, heating, air-conditioning, mass irrigation, drought-relief convoys, and advance warning systems. We should recognize that if we want to make more people safe from climate, we need to liberate fossil fuel use.

Unfortunately, most of our leaders today do not look at the big picture of what will benefit human life. Instead, they make declarations such as the G7's 2015 pronouncement that the world needs to make illegal up to 70 percent of today's fossil fuel use by 2050—in a world where half the people have virtually no energy, and where 2 billion more people are expected to join the population. They do nothing to rebuke the wildly irrational anti-nuclear movement, which claims to want to limit CO2 emissions but opposes the most efficient non-CO2-emitting technology. They declare that we should be forced to use on a large scale the same forms of unreliable energy that are ruinous on a small scale. And they invoke more outlandish climate predictions based on the same assumptions the last bunch were based on.

What is causing this moral malpractice? The failure of our moral discussion to identify, defend, and apply a rational moral standard.

### The Immoral Philosophy Behind Divestment

The default moral standard used by all sides in discussing energy and environmental issues is *not* maximizing human well-being—it is minimizing human impact.

950 *The International Disaster Database*, Centre for Research on the Epidemiology of Disasters. http://www.emdat.be/.

This is most evident among the Green leadership, who explicitly hold as their standard of value what they call "pristine" nature or wilderness—nature unaltered by man.

For example, in a *Los Angeles Times* review of *The End of Nature*, McKibben's influential book of twenty-five years ago predicting catastrophic climate change, David M. Graber, research biologist for the National Park Service, wrote this summary of McKibben's message:

> *McKibben is a biocentrist, and so am I. We are not interested in the utility of a particular species or free-flowing river, or ecosystem, to mankind. They have intrinsic value, more value—to me—than another human body, or a billion of them. Human happiness, and certainly human fecundity, are not as important as a wild and healthy planet. I know social scientists who remind me that people are part of nature, but it isn't true. Somewhere along the line—at about a billion [sic] years ago, maybe half that—we quit the contract and became a cancer. We have become a plague upon ourselves and upon the Earth. It is cosmically unlikely that the developed world will choose to end its orgy of fossil-energy consumption, and the Third World its suicidal consumption of landscape. Until such time as Homo sapiens should decide to rejoin nature, some of us can only hope for the right virus to come along.*

In his book, McKibben wrote that our goal should be a "humbler world," one where we have less impact on our environment and "Human happiness would be of secondary importance." What is of primary importance? Minimizing our impact on our environment. McKibben explains: "Though not in our time, and not in the time of our children, or their children, if we now, today, limited our numbers and our desires and our ambitions, perhaps nature could someday resume its independent working." This implies that there should be fewer people, with fewer desires, and fewer ambitions. This is the exact opposite of holding human life as one's standard of value. It is holding human nonimpact as one's standard of value, without regard for human life and happiness.

Earlier we saw that human beings are safer than ever from climate, despite whatever impact we have had from increasing the concentration of CO2 in the atmosphere from .03 percent to .04 percent.

And yet Bill McKibben and others call our present climate catastrophic. By what standard? In his book *Eaarth*, McKibben argues that it's tragic for human beings to do anything that affects climate, even if it doesn't hurt human beings. He writes, referencing an earlier work:

> *Merely knowing that we'd begun to alter the climate meant that the water flowing in that creek had a different, lesser meaning."Instead of a world where rain had an independent and*

*mysterious existence, the rain had become a subset of human activity," I wrote. "The rain bore a brand; it was a steer, not a deer."*

This means that something is morally diminished if human beings affect it. If fossil fuels changed climate, but not in a way that harmed humans—or even helped them—would it be right to use them because of their benefits to human life? On a human standard of value, the answer is absolutely yes. There is nothing intrinsically wrong with transforming our environment—to the contrary, that's our means of survival. But to green leaders, our means of survival is fundamentally corrupt. And transformation of nature is immoral—which is why they are always inclined to find fault with the most practical forms of energy.

Case in point: several decades ago, in response to the prospect of nuclear fusion, which, if achieved, would be the cheapest, cleanest, safest form of energy ever developed, leading environmentalists have expressed not eagerness but horror: According to energy thought-leader Amory Lovins: "Complex technology of any sort is an assault on human dignity. It would be little short of disastrous for us to discover a source of clean, cheap, abundant energy, because of what we might do with it." Paul Ehrlich said allowing human beings to have so much energy would be "like giving a machine gun to an idiot child."

These thought-leaders are not isolated lunatics—they influence the way everyone thinks about energy and everything else under the ideal of being Green.

Green is often associated with a lack of pollution and other environmental health hazards, but this is both far too narrow and highly misleading. Consider the range of actions that fall under the banner of Green. It is considered Green to object to crucial industrial projects, from power plants to dams to apartment complexes, on the grounds that some plant or animal will be affected, plants and animals that take precedence over the human animals who need or want the projects. It is considered Green to do less of anything industrial, from driving to flying to using a washing machine to using disposable diapers to consuming pretty much any modern product. (There is now an attack on iPhones for being insufficiently Green, given the various materials that must be mined to make them.) The essence of "going Green," the common denominator in all its various iterations, is the belief that humans should minimize their impact on nonhuman nature.

Why do we accept the Green ideal, the ideal that causes us to hate our greatest energy technology and the people who produce it?

In large part, we do so because environmental leaders have made us associate the anti-human ideal of non-impact with something very good: minimizing pollution, that is, minimizing negative environmental

impacts. But if you're antipollution, Greenness or nonimpact is a confusing and dangerous way of thinking about the issue, for by associating impact with something negative, you're conceding that all human impact is somehow bad for the environment. And that's what the Green movement wants you to believe. Instead of recognizing that transforming our environment is a life-serving virtue that can have environmentally undesirable risks and side effects, the Green movement wants you to look at all transformation of our environment as environmentally bad.

In fact, the worst thing we can do environmentally is not transform our environment, because then we would live with the threat-laden and resource-poor environment of undeveloped nature. Another reason we buy into Green is because we as a culture have never been fully comfortable with human industry. We're taught that the pursuit of profit is wrong, that capitalism is wrong, and that we should feel guilty for our wealth and way of life. Accepting non-impact as our environmental ideal primes us to swallow any argument that an industry's environmental impact is too high and to assume that the consequences of any environmental impact must be bad—even while we wake up every day in the greatest environment in history. That's the power of prejudice—prejudice that comes from holding a false philosophy we don't know we accept and that most of us would fully reject if we saw its real meaning. Now that we know its meaning, we can look for—and embrace—a new, humanist approach to moral and environmental issues.

**Conclusion**

Bill McKibben is right: divestment is a moral issue. And anyone who values human life needs to recognize it as an anti-human moral movement based on an anti-human moral philosophy.

The people of the US and the world need to unite against this assault on progress. The 20th century was full of "elite" nations inflicting horrific ideas on the world—Communism, eugenics, national socialism, DDT bans. In the 21st, opponents of fossil fuels, including the divestment movement, are trying to inflict one of the most horrific ideas possible: the abolition of lifeblood of our present and our progress. Those who truly value human life must be willing to declare proudly: humanity has a moral obligation to use more, not less, fossil fuels.

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## William M. Briggs: The Joys of Divesting From Reality

### To Be Young (And Uneducated) Is Very Bliss

Imagine this:

*Vladimir Putin sits as his desk doodling on a map of Europe. He erases "Istanbul" and is about to pencil in "Constantinople" when Foreign Minister Sergey Lavrov rushes in and announces, "Mr President! The Rhode Island School of Design, enrollment 2,420 students, has voted to divest from direct investments in fossil-fuel extraction companies. They will sell all 1,000 shares of Gazprom!"*

*Putin sits stunned. After what seems like an hour he rises slowly, snaps his pencil in two, tears his shirt, and says, "I see now that I must do my part to save the planet. Withdraw the troops. Shut down all gas production facilities. When the snow melts in Siberia, slaughter the remaining cattle and install organic solar panels. And bring in that man who does face piercings."*

Something very like this little fantasy is playing out in the minds of thousands of college students and their spiritual guides (professors) across these once United States. How thrilling to believe that the mere selling of oil and coal stocks to eager buyers can topple the mightiest and save from certain doom our dear, living, breathing planet—Gaia herself!

Perhaps it isn't the actual *selling* that brings such glorious frissons of excitement, but the idea that one is *seen to demand* the selling. It has become a tradition for students to seek attention over their support of noble and just causes, causes of unimpeachable purity. It beats the hell out of studying. Yet college students, by being students, are by definition ignorant of the subjects which interest them. Still, this ignorance has been no bar to claims of complete and total knowledge. Students not only know all the problems which beset mankind, they know all the ideal solutions. Students in divestment movements and the like no longer attend college to be educated, but to be assured that what they believe is true, to be told that feeling, ardency, and sincerity are supple and adequate replacements for thinking. Professors are engaged not to explore topics in depth, but to provide support for sacred preconceptions.

It's not only students, of course, but post-students, students who have been released into the wild and who have become environmentalists, activists, or simply those who deeply *care*. Strange thing about the concerned, though: they don't care enough to learn physics. You couldn't get one agitator in a thousand to define vorticity. Why? Have you seen how difficult the equations of motion are when developed into parcel theory on a rotating three-dimensional sphere? Those are nothing next to radiative transfer and the chemistry of isoprenes and other potential condensation nuclei as they apply to cloud parameterization schemes. And don't get me started on coupled ocean-atmosphere dynamics!

Don't get the students started, either. It's much easier to memorize a handful of slogans and suspicious statistics and fill yourself with zeal than to venture on a four- to eight-year uphill journey into hard-core physics. Besides, learning is dangerous, a known killer of enthusiasm. Once a subject is learned in depth, unwelcome uncertainties arise. The old adage that the more you know, the more you realize you don't know is in force. Why, spend enough time with books and you could reach the point where others learn of your lack of total commitment. Next thing you know somebody is screeching "Denier!" in your face. Who needs that kind of grief?

So students and professors steer clear of difficulties and join protests instead, which are more enjoyable. They stamp their feet and weep and create a nuisance of themselves until they get what they want. Which is for their alma maters to sell their shares in oil, coal, and gas companies.

To this end, the group Go Fossil Free, undisputed leader of all things divestment, has helpfully compiled a list of the world's largest fossil fuel companies, to be used by timid administrators and other social justice warriors to identify targets of their wrath. Some minor fun can be had examining this list. Top four coal companies: Coal India, China Shenhua, Adani (India), Shanxi Coking. Top four oil and gas: Gazprom, Rosneft (Russia), PetroChina, ExxonMobil. Notice anything peculiar? Yes: each of these, and most of the others on the list, have close ties to their national governments, if they are not owned or run by them. And most of them aren't from the good old USA. Why is this important?

Divestors joyfully explain how their techniques brought South Africa to its knees, a boast which contains a kernel of truth. At the time of the moral panic over South Africa's policy of apartness, in the mid 1980s to mid 1990s, its GDP was roughly 100 billion (in US dollars). Colleges divesting themselves of Krugerrands and so forth had the effect of a handful of mosquitos, drawing inconsequential amounts of blood. It wasn't until the United States government itself jumped on board that divestment had any real sting. An Act was passed, and a presidential veto overridden, that disallowed new government investments and which constricted trade in a number of areas.

It's a better than good bet the United States government, keen as they have been at appeasing environmentalists, to the point of using environmental concerns as levers to gain and accumulate power, will not simultaneously cut off all trade with India, China, Russia, and other countries which rely heavily on fossil fuels. Which, except for the occasional African dictatorship, is all of them. Every American college can sell every stock directly connected to fossil fuel production and the effect on that production will be negligible. It's not as if there aren't buyers for these stocks, like there weren't for shares in South Africa. Indeed, buyers will be pleased at the small decreases in price divestment selling causes. It will make fossil fuel stocks even more attractive.

These unfortunate realities will do nothing to dissuade the divestment movement, of course, which will peter out from exhaustion like these things always do. But just why are folks so worked up? Why do they feel (not think) that off-loading a few shares of stock will bring revolution? Because, they say, it will stop climate change.

**Don't Say Climate Change**

Stopping climate change is impossible. It's not that it's unlikely, or that's it's a difficult task, or that we don't have the political or social will. It is that it is impossible. As in *not possible*. As in *cannot happen no matter what, no matter the purity of our hearts*. It would be easier to build a perpetual motion machine than to stop the climate from changing. Noam Chomsky will wave an American Flag at a Fourth of July parade in Mobile, Alabama, before the climate becomes immutable.

The climate on earth has always changed. It always will change. It has never, not ever, remained static. It cannot stand still. Orbital mechanics, the sun, and the nature of the earth's surface and bulk properties of the atmosphere are by far the largest and most important drivers of the climate. No number of college students can cajole a sufficient mass of administrators to pass resolutions strongly worded enough to cause the earth to stop varying in eccentricity, axial tilt, and precession. No government can inflict enough taxes to halt the sun from changing its radiative output. And no bureaucracy can implement sufficiently Draconian regulations to cause a redistribution of land and sea fast enough to counter the effects of this sun-orbit conspiracy.

Incidentally, weren't we promised *global warming* and not *climate change*? The two are not equivalent. The climate changes if the globe warms, but the climate also changes if it cools. We were assured the climate was going to warm, not cool. That the climate hasn't warmed these past two decades led panicked activists into switching phrases. Don't fall into their trap. Say *global warming*, not *climate change*.

Some sophisticated environmentalists don't argue for stopping global warming, but for limiting warming to less than 2°C. This number is, of course, entirely *ad hoc*. Is it 2°C everywhere? Or in specific locales? Only summer? Or in the other seasons? Only for daytime temperatures? Or what? It is true 2°C sounds good: it's a number, and numbers are what make science, and so 2°C sounds sciency. It isn't: it's purely political.

And there's more: 2°C compared to what? A globally averaged temperature from some historical period? Which? We don't know what the temperature was to any real degree of reliability before satellites were launched (late 1970s). The best we know is what the temperature was plus-or-minus. And those plus-or-minus bounds are not insignificant. The further we go back, the wider these get. The public isn't aware

of these kinds of uncertainties because temperature is al ways shown without the plus-and-minuses, as if there is no uncertainty. Even many scientists, for technical reasons having to do with misunderstanding the differences between model fit and model predictions of observables, underestimate uncertainty.

The key argument against the 2°C figure is we have no idea whatsoever how to reach it. And that's because our understanding of how much influence mankind has on the atmosphere is certainly wrong. How do I know? I'll tell you. Back in the good old days, every scientist used to swear by a golden rule, which was the backbone of the once-celebrated scientific method. This is the rule: if a theory can't make accurate predictions, then it's wrong. Climate models can't and haven't made accurate predictions. Not only can climate models not predict the future well, they are getting worse at their job. The discrepancy between models and reality is growing wider. Therefore, old timers would say, the theories which drive these models must be wrong.

Which theories are wrong? It's not my job to say (though I've had a stab at it elsewhere with some colleagues, a foray that started a Congressional firestorm, which is a story for another time). The burden of proof is not on skeptics to perform the long-delayed autopsies.

It is on those who claim their theories represent reality. It is an indisputable fact that the models are wrong and thus so are the theories. That means we do not know how much of an effect mankind is having on the atmosphere. And that means it's foolish to assume that we must only be having a negative effect and thus that we should "do something." Doing something might cause harm, and we can't prove it wouldn't if we can't prove how the atmosphere works to the level of detail required. The depressing news is that we scientists know far less than we should rarely makes the news. Like I said, who needs the grief that accompanies doubt? Climatology is now as much a branch of politics as it is science, and it is politically dangerous to doubt.

I do admire the brilliance, the genius of those who have orchestrated campaigns around "climate change." Since the climate will always change, any change that happens can be said or implied to have been caused by man, or by a particular group of men thought most in need of political control. Even if we agree on the baseline temperature to compare that 2°C to, and even if we agree on how to measure current temperatures (locales, times, and so on), and even if the temperature doesn't increase as it hasn't for almost two decades, there will still be changes in the climate. That means failing to meet the 2°C target can always be threatened. "Scientists say the potential of crossing the deadly 2°C threshold is significant, therefore the following measures will be implemented…"

Divestment is one of these measures. It's now in its trivial stage, and it won't progress beyond the trivial—as long as it stays inside the padded halls of academe.

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